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Does a mindfulness intervention have a significant effect on preference for intrinsic or extrinsic benefits of environmentally friendly behaviours?

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Abstract

There is an increased interest in encouraging the public to regularly demonstrate environmentally friendly behaviours. Previous research has suggested that these behaviours can be sustained for longer if the individual is intrinsically motivated rather than extrinsically motivated. People who feel a high connection to nature are more likely to demonstrate environmentally friendly behaviour; this can be measured both explicitly and implicitly. It is important to cultivate a high implicit connection to nature because implicit attitudes have an underlying influence on performing environmentally friendly behaviours that are not deliberately thought about. Mindfulness can be used by individuals with a low connection to nature to reconceptualise how they perceive the environment and increase how connected they feel to it. The current study investigates whether mindfulness can be used to increase implicit connection to nature and preferences for the intrinsic benefits of environmentally friendly behaviours. Participants were assigned to either a mindful or mindless intervention and completed an IAT, INS, and an environmental behaviour test phase. The results showed that there was not a significant change in IAT score because of the intervention and that the participants in the mindfulness condition did not have a significant preference for the intrinsic benefits of environmentally friendly behaviours. This implies that the mindfulness intervention cannot be used to intrinsically motivate individuals to behave in an environmentally friendly manner.

Keywords: mindfulness, mindfulness intervention, intrinsic benefits, implicit connection, extrinsic benefits, intrinsic motivation, extrinsic motivation, environmentally friendly behaviours, psychology

Ethics Statement and Data Collection

This research was conducted according to ethical guidelines set out by the British Psychological Society and been approved by the University of Plymouth's ethics committee after the first submission. The participant data was collected by myself on campus at the University of Plymouth and has not been altered. All participants had been given a brief (see Appendix A) giving an overview of the study and had the opportunity to ask questions before giving their informed consent to take part. They were also informed that they had the right to withdraw from the study at any point without explanation and would not be penalised. Participants were assigned an identification number, and contact information was supplied on the de-brief sheet (see Appendix B) if they wished to retract their data. All data collected remained confidential and anonymous.

Introduction

In May 2019, the Parliament of the United Kingdom declared a climate change emergency (Cowburn, 2019). This was in response to mounting scientific evidence and public opinion that carbon emissions need to be reduced to combat climate change (Brown, 2019). This has led to an increased interest in promoting environmentally friendly attitudes and behaviours so the general public can reduce their carbon footprint. Studies have found a stronger correlation between pro-environmental attitudes and behaviours in more developed countries (Pisano & Lubell, 2017). But while Europeans are more likely to have positive attitudes towards environmental issues, it is not guaranteed that these attitudes will also translate into environmentally friendly actions (Pirani & Secondi, 2011). This has raised the question of how behaviour can be changed to become more environmentally friendly so that it aligns with individual's eco-friendly beliefs and values.

It is not clear what the most effective method of promoting behaviour change is, and currently many environmental campaigns use a variety of methods to try and encourage the public to reduce their consumption of resources. To encourage behaviour change, the individual needs to be sufficiently motivated. Motivation to complete a task or exhibit a behaviour can be divided into two groups: extrinsic and intrinsic. Intrinsic motivation is where the individual completes a task because they enjoy it and find it interesting or satisfying. Whereas, if the individual is striving to achieve a reward, such as money or increased social status, it is defined as extrinsic motivation (Amabile, Hill, Hennessey, & Tighe, 1994). Individuals who are extrinsically motivated to perform a behaviour are likely to sustain it for a shorter length of time when compared to intrinsically motivated individuals (van der Linden, 2015). A meta-analysis found that this is due to extrinsic rewards having a significant negative effect on intrinsic motivation because the possibility of a reward undermines the individual's responsibility for motivating themselves (Deci, Koestner, & Ryan, 1999). A popular method that is used by environmental campaigns to promote behaviour change is to promote the extrinsic benefits of environmentally friendly behaviours, such as explicitly stating any monetary benefits. However, in one study, this had a detrimental impact on the willingness of participants to enrol on the program (Schwartz, Bruine de Bruin, Fischhoff, & Lave, 2015). Therefore, it can be suggested that environmental campaigns should place more emphasis on cultivating intrinsic motivation within people. This is because they will be more likely to maintain environmentally friendly behaviours over a longer amount of time than if they were extrinsically motivated.

One of the reasons why some people display environmentally friendly behaviours is because they feel close to nature. The biophilia hypothesis suggests that humans have an innate predisposition to develop a bond with animals and the natural environment (Grinde & Patil, 2009). 'Connectedness to nature' is a term used to describe this bond and measure the extent to which people identify themselves with the natural world and include nature within their cognitive representation of the self (Restall & Conrad, 2015; Schultz, 2000). The Value-Belief-Norm model that was adapted by Schultz, Shriver, Tabanico and Khazain (2004) can be used to explain how an individual's level of connectedness to nature provides a basis for the types of concerns they develop about nature. Within this model there are three types of values: social altruistic, egoistic, and biospheric. Biospheric values focus on the well-being of living things such as animals, plants, and trees; and research has found that it is positively correlated with pro-environmental behaviour (Schultz & Zelezny, 1998). For individuals with strong biospheric values, damaging nature would go against their beliefs and would be akin to hurting themselves. It is suggested that individuals with egoistic values will only be concerned about the environment to the extent to which environmental problems will personally affect them (Dutcher, Finley, Luloff, & Johnson, 2007). Whereas, individuals with social altruistic values are concerned for the welfare of other humans (Deng, Walker, & Swinnerton, 2006). The Value-Belief-Norm model explains how an individual's perception of situations and the perceived consequences for the valued environmental object motivate them to act. For example, people with biospheric or social altruistic values are hypothesised to care about the environment, regardless of whether it directly affects them. A different model by Thompson and Barton (1994) theorised that individuals high in ecocentric values appreciated nature for its intrinsic value, whereas individuals high in anthropocentric values respected nature for its contribution to the quality of life for humans. Thus, holding biospheric, social altruistic, and ecocentric values in high esteem could result in individuals being intrinsically motivated to perform environmentally friendly behaviours, regardless of any extrinsic reward or benefit, since it will be in line with their core values.

A method of obtaining an explicit statement of an individual's sense of connection to nature is through using the Inclusion of Self in Nature scale (INS). This consists of a selection of pairs of circles representing the self and nature that overlap in varying degrees, and the participant is asked to select the pair they feel best embodies how close they feel to nature (Schultz, 2001). However, a potential issue with participants explicitly stating their connection to nature is that it requires them to have thought about the topic beforehand and to have developed an opinion (Schultz et at., 2004). Explicit statements may also be subject to a social desirability bias that lead the participants to alter their true opinions so they can be viewed favourably by the experimenter (Fisher, 1993). Thus, an alternative method may be required to measure the core attitudes that influence behaviour.

Implicit attitudes are not influenced by conscious attitudes or decision making and instead reflect the underlying values that may unconsciously influence behaviour. The Implicit Association Test (IAT) can be used to measure the strength of automatic associations with nature or the built environment that humans have created, without the need for a conscious decision-making process. However, it has been found that there is a low correlation between implicit and explicit associations of connection to

nature (Greenwald, McGhee, & Schwartz, 1998). Generally, implicit connection to nature can predict spontaneous environmental behaviours, whereas explicit connection to nature can predict deliberate environmental behaviours (Perugini, 2005). Thus, it is important to cultivate a high implicit connection to nature because this unconscious attitude will have a strong underlying influence on enacting environmentally friendly behaviours that are not deliberately thought about.

One method of increasing connectivity to nature is through the practice of mindfulness; a term that can be conceptualised through two approaches. The first derives from the practice of Buddhist meditation that involves consciously focusing on the present moment without passing judgment (Shapiro, Carlson, Astin, & Benedict, 2006). An alternative Western approach defines mindfulness as cognitive flexibility where the individual demonstrates creativity by reconceptualising the environment through the creation of new categories or distinctions (Haigh, Moore, Kashdan, & Fresco, 2011). Henceforth, the second approach will be referred to when discussing mindfulness. This process involves the ability to create novel conceptions, have an openness to the unfamiliar, an ability to solve problems using multiple perspectives, and to be sensitive to the environment (Langer & Moldoveanu, 2000). A study by Vining, Merrick and Price (2008) found that many people simultaneously considered themselves part of nature, but their general perception of the natural environment does not include humans or man-made objects. For individuals who, to some degree, view humans as separate from nature, using mindfulness could increase their connection to nature because they could use cognitive flexibility to think about the topic in a novel way. It could be suggested that this will in turn increase their intrinsic motivation to incorporate more environmentally friendly behaviours into their everyday routine. Thus, it can be suggested that a mindfulness intervention could be used to cultivate a state of mind that increases a sense of connection to nature which will lead to an increase in automatic environmentally friendly behaviours (Wang, Geng, Schultz, & Zhou, 2017).

Some behaviours are either mindfully or mindlessly performed, and many everyday habits are automatic actions that result from heuristic processing (Bargh & Chartrand, 1999; Krarup & Russell, 2005). The elaboration likelihood model details how attitude change and decision making can be processed through two routes of persuasion: the central route and the peripheral processing route. The central route involves deliberate consideration of information and the generation of positive or negative thoughts relating to the topic that may result in a change in attitude and behaviour (Petty, Barden, & Wheeler, 2009). Whereas, heuristic processing can occur when the individual has little motivation or ability to deliberately consider the persuasive communication, relying on mental shortcuts to quickly form an opinion or decide on a course of action. Heuristic processing through the peripheral route itself is neither harmful nor beneficial. But if this processing style results in mindless, unsustainable behaviours it can be detrimental to the environment and will not change unless the individual consciously decides to alter their behaviour (Petty et al. 2009; Amel, M, & Scott, 2009). This would require them to cognitively process the situation systematically through the central route; but this requires full attention without distractions, the topic to be of high personal relevance, and there needs to message congruent thinking if they are to change their behaviour (Petty & Cacioppo, 1986). Thus, if people can be taught to be more mindful in their everyday life, they may be

less likely to make automatic, mindless decisions and may spend more time thinking about the impact that consumerism has on the wider world (Rosenberg, 2004).

The following study investigates whether a mindfulness intervention significantly increases preference for the intrinsic benefits of environmentally friendly behaviours when compared to a mindless intervention. To date, few studies have investigated this exact issue but a study by Wang et al (2016) successfully used a mindful learning intervention to increase participants' implicit and explicit connection to nature. Tang et al (2017) also used a similar mindful learning intervention and found that participants had significantly higher pro-environmental behaviour scores when compared to a control group. The mindful and mindless learning interventions that shall be used in the current study have also been used by Wang et al (2016) and was created by Geng, Zhang and Zhang (2011). The mindfulness and mindless materials include different tasks of categorization, free association, and multi-perspective taking. The mindfulness materials are used to create a situation where the participants can use a different perspective when attending to a familiar situation. This type of mindfulness uses a process similar to creativity because it requires the individual to reconceptualise their perception of the object and to display flexibility in their thinking (Langer & Piper, 1987). Whereas, the mindless materials enable the participants to complete the task without using much cognitive effort and without breaking from their traditional thinking patterns which are based upon previously learned associations (Haigh, Moore, Kashdan, & Fresco, 2011). This enables any pre-existing conceptions that humans are separate from nature to continue. In comparison, participants who interact with the mindfulness materials will experience an increase in their sense of connection to nature because they will approach the situation using a different perspective.

The current study also uses an IAT based upon the one used by Schultz et al. (2003) that is used to measure implicit connection to nature which in turn predicts spontaneous behaviours. Whereas explicit connection to nature is measured using the INS which predicts more deliberate behaviours (Geng, Xu, Ye, Zhou, & Zhou, 2015). The current study uses the IAT twice to measure whether a change in scores before and after the intervention stage significantly predicts preferences for the intrinsic benefits of environmentally friendly behaviours. The IAT was used instead of the INS to measure this difference because these implicit connections are measures of the underlying attitudes that influence automatic behaviours that require little explicit thought.

Hypothesis one predicts that the mindfulness condition will significantly increase participants' connection to nature IAT score when compared to the mindless condition. Hypothesis two predicts that the mindfulness condition will result in a significantly higher preference for the intrinsic benefits over the extrinsic benefits of environmentally friendly behaviours when compared to the mindless condition.

Method

Participants

Participants were 22 females and 6 males (N = 28) and a mean age = 20.71 (SD = 5.67). They were all psychology undergraduate students from the University of Plymouth and were awarded 1 participation point each in return for their time.

Materials

An online questionnaire was developed to measure explicit and implicit environmental attitudes, along with an intervention to manipulate mindfulness, and a test to measure preferred benefits of environmentally friendly behaviours.

Nature-Built Implicit Association Test (IAT)

This was based on the modified version by Schultz et al (2004). However, the number of variables in each category was reduced from 5 to 4 due to time constraints but it is unlikely this change will have a significant negative effect on the IAT results (Nosek, Greenwald, & Banaji, 2005). The IAT measured the response time (in ms) for participants to classify words into the correct categories. Participants were given verbal and written instructions on how to complete the task and had the opportunity to ask questions. The IAT consisted of seven blocks of eight trials, with each trial consisting of a word and two categories (see Appendix C). The four categories were: 'Nature', 'Built', 'Me', and 'Not me'. Blocks 1 and 2 were practice rounds for the participants to get accustomed to the experiment. Blocks 3 and 4 consisted of compatible pairings such as Nature/Me – Built/Not me. Whereas, blocks 6 and 7 were incompatible pairings i.e. Built/Me – Nature/Not me. The results were interpreted as the shorter the response time for words in the 'Me' category, the closer they felt to either the 'Built' or 'Nature' category that it was paired with. Words were shown in the centre of the screen for five seconds before registering it as incorrect if the participant did not respond.

Inclusion of Self in Nature Scale (INS)

This was based on the one-item measure developed by Schultz (2001) which consists of seven pairs of overlapping circles that are labelled 'nature' and 'self'. These circles range from completely overlapping to not overlapping and only touching (see Appendix D) and the participants chose the pair of overlapping circles that they felt best represented their explicit relationship with nature.

Mindfulness and mindless intervention

Based on the material created by Geng et al. (2011), the materials were designed so that the participants were led to approach the tasks using different perspectives. Previous studies have found that a mindful or mindless state can be created using different wording to introduce an item (Langer & Piper, 1987). The mindfulness condition focussed on cultivating mindfulness and consisted of tasks of categorization, free association, and multi-perspective taking (see Appendix E). The first and second categorization tasks supplied the participants with a set of words and asked them to sort words into different self-defined categories and match the different occupations to the adjectives. The free association task supplied the participants with two pictures and asked them to create a story, and the multi-perspective taking task asked participants to write down ten possible functions for a bottle of purified water. The mindless condition consisted of a true or false task, completion, categorization, and multi-perspective taking (see Appendix F). The multi-perspective taking task asked participants to write down two basic functions of a bottle of purified water. The first categorization task asked participants to sort words into groups of tools, fruit, and animals. The first completion task asked participants to complete various unfinished sentences along with a true or false task. The second categorization task asked participants to separately count the number of the fruit,

vegetable, and other foods in the picture. The second completion task asked participants to connect each of five jobs to the words that described them.

Motivation for environmentally friendly behaviours test phase
This was independently created by the researcher, and individually gave 11 examples of environmentally friendly behaviours that were written on the computer screen (see Appendix G). Alongside each behaviour, the participants were presented one intrinsic motivation and one extrinsic motivation of which they could select which one they automatically preferred. Participants were also given the option to select 'NA' if the behaviour did not apply to them.

Design and Procedure

The study was a between-subjects design in which the participants were randomly allocated to either the mindfulness condition or mindless condition during the intervention stage. Participants' demographic information such as age and gender were collected before the study began. The study began with the question 'To what extent are you concerned about the environment?' to which they could respond on a 5-point Likert scale labelled '1 = very unconcerned, 2 = mildly unconcerned, 3 = neutral, 4 = mildly concerned, 5 = very concerned'. They were also asked 'On average, how financially secure are you each month?', to which they could respond 'I struggle to pay essential expenses', 'I am able to pay the essential bills with a little money left over', 'I am able to pay the essential bills and have enough money left over to spend on luxuries/ save', 'prefer not to answer'. A Nature-Built IAT test was then conducted to measure participants' connection to nature before moving onto the INS where they could explicitly state how close to nature they felt. During the intervention stage, participants were randomly allocated to either the mindfulness condition, where they interacted with the mindfulness material, or the mindless condition where they interacted with the mindless material. In the mindfulness condition, participants were given time limits for each section. They had two minutes to complete the multi-perspective taking task, four minutes for the first categorization task, three minutes for the free association task, and five minutes for the second categorization task. In the mindless condition, the time limits for each section were as follows: one minute for the multi-perspective taking task, three minutes for the first categorization task, two minutes overall for the first completion task and true or false task, four minutes for the second categorization task, and four minutes for the second completion task. The participants then completed the same Nature-Built IAT as they did earlier in the study. The experiment then moved onto the test phase where participants were presented two benefits of environmentally friendly behaviours and asked to select which they immediately preferred. Participants were then debriefed at the end of the study.

Results

Data preparation

Before analysing the responses to the motivation for environmentally friendly behaviours test phase, the participants' number of intrinsic and extrinsic responses to the environmentally friendly behaviours were calculated. The NA responses were also discarded from the overall score during this calculation. Then, the proportion of intrinsic responses was calculated in SPSS for each participant before it was used in further analyses.

Hypothesis one

To test the hypothesis that the mindfulness condition would significantly increase connection to nature in comparison to a mindless condition, a repeated measures ANOVA was conducted to compare the effect of either a mindfulness or a mindless intervention on IAT score before and after the intervention. There was not a significant effect of intervention condition on IAT score, Wilks' Lambda = .93, $F(1, 26) = 2.08$, $p = .16$. This non-significant result does not support the hypothesis that the mindfulness condition can be used to increase connection to nature.

Hypothesis two

Hypothesis two theorises that participants in the mindfulness condition would have a significant preference for the intrinsic benefits over the extrinsic benefits of environmentally friendly behaviours in comparison to participants in the mindless condition. This was analysed using an independent samples *t*-test that was conducted to compare the proportion of intrinsic responses in the mindfulness and mindless conditions. There was not a significant difference between the proportion of intrinsic responses in the mindfulness condition ($M = .74$, $SD = .14$) and the mindless condition ($M = .68$, $SD = .15$); $t(26) = 1.12$, $p = .27$. While it can be noted that the proportion of intrinsic answers was higher for the mindfulness condition than the mindless condition, the difference was not statistically significant. Therefore, this non-significant result does not support the hypothesis that the mindfulness condition would lead to a significant preference for the intrinsic benefits of environmentally friendly behaviours.

Exploratory analysis

The current experiment used a between-subjects design and found that most participants rated their concern for the environment as either concerned (57.1%) or very concerned (39.3%), with only one participant (3.6%) rating their concern as neutral. Most of the participants also were able to pay the essential bills with a little money left over (57.1%) or with enough money left over to spend on luxuries and save (39.3%), with only one participant struggling to pay essential expenses (3.6%). The mean score on the INS 6-point scale was 3.96 ($SD = 1.07$). An IAT and INS was used to investigate whether the two measures of connection to nature were correlated. However, the INS score was not significantly correlated with the first IAT score, $r(28) = .09$, $p = .64$, or the second IAT score, $r (28) = .24$, $p = .22$, suggesting that there was not a reliable positive correlation between the two factors. This means that explicit connection to nature is not significantly correlated with implicit connection to nature.

Discussion

The current study investigated the hypothesis that the mindfulness condition would significantly increase the participants' connection to nature IAT score when compared to the mindless condition. The results showed that there was not a significant change in IAT score after the intervention stage between conditions, suggesting that the mindfulness intervention used in this study does not increase connection to nature. These results do not support the findings of Wang et al (2016) who found that the mindful learning intervention was effective at increasing implicit and explicit connection to nature. The study also investigated whether participants in the mindfulness condition would have a significant preference for the intrinsic benefits of environmentally friendly behaviours, over the extrinsic benefits. The

results showed that there was not a significant difference in the proportion of intrinsic responses between the mindfulness and mindless conditions. This shows that the participants in the mindfulness condition did not have a significant preference for the intrinsic benefits of environmentally friendly behaviours. The results of this study also show that explicit connection to nature is not significantly correlated with implicit connection to nature. This supports the findings of Greenwald, McGhee, and Schwartz (1998) who concluded that the weak positive correlation between implicit and explicit measures of connection to nature suggested that they were divergent constructs. While the correlation in Greenwald et al (1998) was reliable and the correlation in this study was not reliable, both came to the same conclusion.

The non-significant difference in IAT score after the intervention may have been due to some participants already having a strong sense of a connection to nature which could not be increased. It may also have been due to the short length of the study that did not allow enough time for a gradual change in implicit attitudes. Future research may investigate whether a low connection to nature IAT score could be increased by an intervention that frequently takes place over a longer period. This would be more likely to create a change in IAT score because implicit attitudes are the result of subtle, internalised changes in mindset that are developed over time.

Another possible explanation for the lack of a significant difference in IAT score may be that the intervention did not successfully create the desired mindful state in participants. It is possible that some participants in the mindful condition may have completed the tasks in the intervention stage a few minutes before the screen moved onto the next task. They may have used the rest of the time to daydream instead of focusing on the task, thus accidentally encouraging a mindless state. In future research, this could be avoided by allowing the participants to choose when to move onto the next screen. It may also be beneficial to use a mindfulness scale such as the Langer Mindfulness/Mindlessness Scale to measure the mindfulness state that the participants are experiencing (Pirson, Langer, & Zilcha, 2018). This would reduce the ambiguity about whether the intervention had elicited a change in the mindful or mindless state. It would also highlight whether high mindfulness scores correlate with a higher preference for the intrinsic benefits of environmentally friendly behaviours. This would be interesting to investigate because it would indicate that it would be beneficial for people to become more mindful in everyday life, so that they are more inclined to demonstrate environmentally friendly behaviours. Alternatively, a different task using a long-term experimental manipulation could be used to promote mindfulness in participants. This might be more successful in promoting mindfulness because it is a learned skill that needs to be practiced over time (Bishop, et al. 2004).

Although participants' concern for the environment was mostly rated as either concerned or very concerned, a similar level of regard for nature was not reflected in high INS scores across all participants. Instead, the INS scores were more varied across the scale, suggesting that some participants may feel concern for the environment without a high degree of connection to nature. Although data on where the participants lived was not collected, it is likely that many of them spend a lot of time in the city where the university is based because they are all university students. It could be suggested that some participants' lower connection to nature may be due to them spending a lot of time in a city with less interaction with environments in nature when compared to people living in the countryside. However, more research

is needed to evaluate the suggestion that connection to nature varies according to the environments that the individual spends time in. In Western Europe, individuals have more egoistic and less biospheric approaches to environmental issues than individuals in Central America (Schultz, et al. 2004). Therefore, it may be interesting for future studies to investigate whether participants in other countries would have a concern for the environment that had a significant positive correlation with their explicit connection to nature. This is because individuals with stronger biospheric values feel a high connection to nature and are concerned when it is threatened.

The difference in results between the concern for the environment scale and the INS could be a result of the two scales potentially measuring different values. The INS has been found to be significantly correlated with biospheric values and in turn with pro-environmental behaviours, in accordance to the Value-Belief-Norm model (Martin & Czellar, 2017). Whereas it can be argued that the question regarding concern for the environment may have measured a combination of egoistic, altruistic, and biospheric values. This is because individuals may conceptualise their concern for the environment regarding how it may affect plants and animals. Alternatively, they may be concerned about how the consequences of environmental damage may affect themselves and other people, without simultaneously experiencing a deep connection to nature itself. There may also be a normative influence to express a higher level of concern about the environment because it is seen as morally acceptable and a popular value to have (Hiller Connell & Kozar, 2012). However, there could be less of a normative influence to appear highly connected to nature and therefore social desirability bias would have a weaker influence over participants' responses. Overall, the results from the two scales show that individuals do not need to be highly connected to nature for them to be concerned about it. However, it can be suggested that individuals need to be highly connected to act on their concerns.

It should be acknowledged that the study was administered within a controlled lab environment rather than in a naturalistic setting where environmentally friendly behaviours take place. Therefore, this may not be a wholly accurate representation of an individual's source of motivation for specific behaviours because in a real-life context their actions will be subject to other external factors and internal states. For example, individuals may be more likely to process information through the heuristic route when the elaboration likelihood is very low, such as if they are short of time (Petty & Cacioppo, 1984). This can have a detrimental impact on the environment if the individual is not naturally environmentally friendly in their automatic behaviours. Further research could involve asking members of the public while they are in a naturalistic environment, such as a shopping complex, to complete a questionnaire regarding the motivation behind their recent consumer behaviours.

Another limitation of the current study is that during the test phase, participants were only given the option of two reasons why they may decide to perform an environmentally relevant action. This does not take into consideration that some participants may have alternative reasons that were not listed. It also did not ask the participants how often they performed the specific behaviour. Thus, it could be argued that it is more accurate to say that the test phase measured environmental intentions rather than environmentally friendly behaviours. Future research could provide the option for participants to write their own reason for why they chose to perform an action. This would avoid the risk of them selecting an option which may

not be the most prominent reason why they may perform a behaviour and would instead produce more accurate results that reflect their actual decision-making process. A potential limitation of using the ISN to measure explicit statements of connection to nature is that it is a single item measure that correlates less than other measures with self-reported behaviour (Martin & Czellar, 2016). Future research could instead measure biospheric values as an explicit measure of connection to nature, using a multi-item measure.

Conclusion

In conclusion, although many people are concerned about environmental issues, fewer people feel a strong sense of connection to nature and so are less motivated to act in an environmentally friendly way if the negative consequences do not affect them directly. This suggests that a change in mindset is required to increase an individual's connection to nature, so they are more intrinsically motivated be environmentally friendly. The current study found that a mindfulness intervention did not significantly increase implicit connection to nature and there was not a significant preference for the intrinsic benefits of environmentally friendly behaviours in participants in the mindful condition. This contrasts with previous research and may be due to problems with the implementation of the mindfulness and mindless intervention. Future research could investigate the effect of a different long-term mindfulness intervention on connection to nature and intrinsic motivation for environmentally friendly behaviours.

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Appendices are provided as 'supplementary files' (see download area).